

## SCENARIO BASED INSTRUCTION: A REVERSE APPROACH FOR CONCEPTUAL LEARNING IN PHYSIOLOGY.

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### Abstract

To evaluate the gain in knowledge of first year MBBS students with the use of scenario-based teaching a reverse approach for conceptual learning in physiology a prospective interventional study was carried out in department of physiology.

**Methodology:** 200 first year MBBS students participated in the study. 100 students (Group-A) were taken as control group to them the topic of physiology was taught by didactic method and another 100 students (Group-B) were taken as intervention group, where the same topic was taught with scenario-based instruction a reverse approach for conceptual learning in physiology. For each lecture pre and post test was taken. Five consecutive lectures were planned with this intervention. At the same time feedback forms were given to intervention group for purpose of analyzing the results qualitatively. After this intervention crossover of groups were done only for the sake of getting benefits of intervention.

**Results:** Data obtained was analyzed statically. Pre and post test mean were taken. The results of post test ( $p < 0.05$ ) were found to be statistically significant when compared with pretest. As per the results of feedback forms, 90% ( $n=100$ ) students agreed that the scenario based teaching is a powerful tool to understand the topic as it improves knowledge and makes learning more interesting.

**Conclusion:** According to the MCQ and feedback analysis, the results showed that teaching topic with scenario based instruction is the better approach for making the students to learn, understand and to gain the knowledge of physiology lectures rather than by traditional lecture alone.

### Introduction

Teaching is effective when learner understands and tries to implement what is being taught. Various teaching aids are in use to make teaching more effective, valuable and measurable (1).

In India medical education is undergoing progressive changes in teaching modalities at par and sometimes above the western standards which are in practice at their respective universities (2).

Scenario based learning makes learner to understand, acquire, retain skills & knowledge. Learner must be placed in a scenario where his/her decisions affect, or alter subsequent events leading to new events (3).

The undergraduate (UG) teaching in physiology has always been a challenging task for medical teachers. The current system of teaching physiology especially in India has been traditionally lecture - based and is likely to remain so at least for the next few years. Traditional lecture format, notwithstanding its many advantages as a large group teaching-learning method, is a monotonous and passive way of learning (4).

Moreover, due to the vast and ever advancing nature of the subject, it usually becomes difficult to keep the content interesting and meaningful. As a result, the current lecture-based teaching learning sessions ensure that the undergraduate medical students are given plenty of information about various theoretical aspects of physiology but there is a big void in the clinical application of this knowledge. This is because even though the students are overloaded with facts, they find it difficult to integrate them into clinically relevant situations and ultimately apply them to the management of patient's illness (5).

The term "scenario-based learning (SBL)" refers to any educational approach that involves the use of scenarios to bring about desired learning intentions (6). Scenarios may constitute a given set of circumstances, a description of human behaviour, an outline of events, a story of human endeavour, an incident within a professional setting, or human dilemma. In this context, a scenario would be a clinical situation requiring applied knowledge of physiology. Hence worth present study scenario based teaching for better conceptual learning of applied physiology was chosen.

### Aim and objectives

**Aim-** Incorporate scenario-based teaching for better conceptual learning of applied physiology.

### Objectives-

1. To introduce scenario based teaching in physiology.
2. To compare scenario based teaching versus traditional teaching in learning of applied physiology.
3. Record the perception of students for better understanding of applied physiology.

### Material and Methods

**Study design-** Interventional study

**Study setting-** The Study was conducted in Department of Physiology, J.N. M. C, Sawangi (Meghe), Wardha after IEC clearance.

**Study duration-** 6 months

**Study participants-** 1st year MBBS students for academic year 2018-2019, at JNMC, Sawangi (M), Wardha.

**Inclusion criteria-** First year MBBS students willing to participate in the study were included.

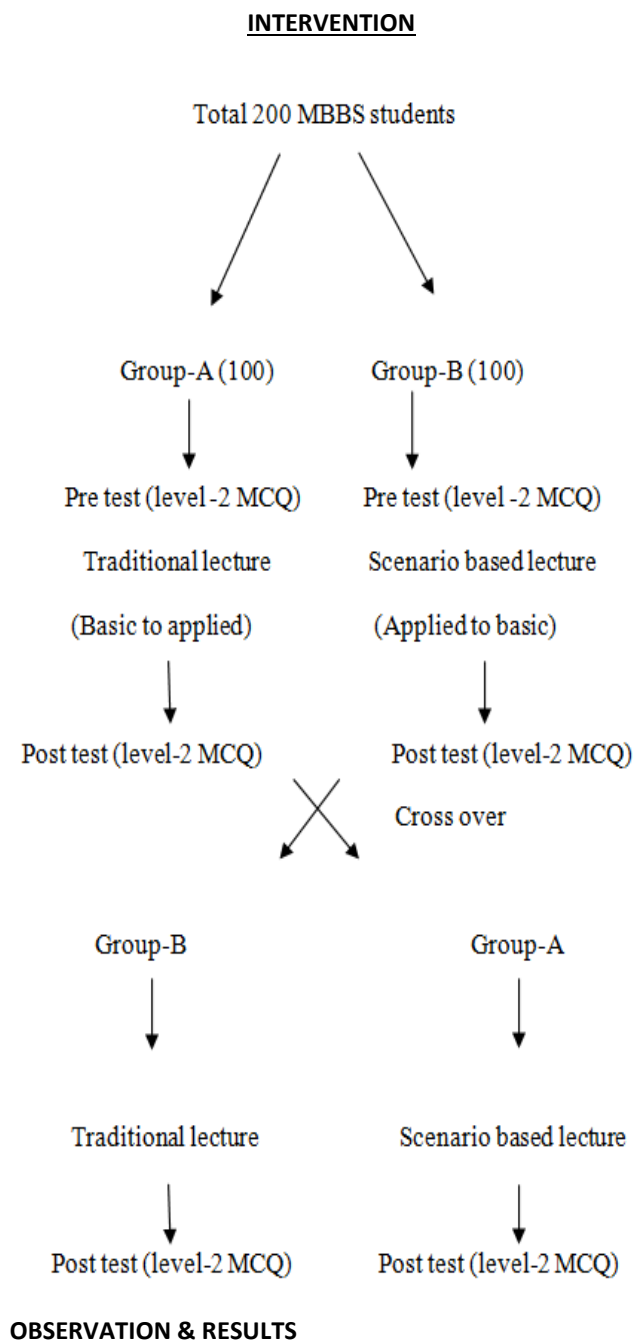
**Exclusion criteria-** Not willing to give consent.

**Sample size-** 200 students

**Sampling method-** Convenient sampling method

**Methodology:** Prospective Interventional study was conducted in department of physiology. 200, 1<sup>st</sup> semester, first year MBBS students participated in the study. The procedure of the study was explained to them. Both study participants and teachers were sensitized before start of the study. Tools were validated from expertise in the field.

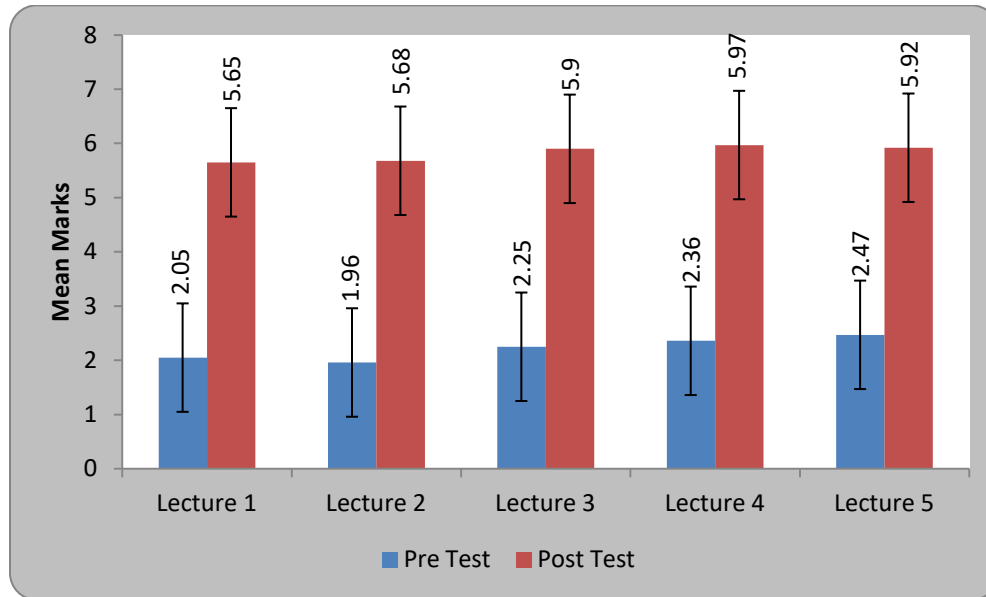
**Intervention** – Group-A, 100 students were taken as control group who were taught lectures by traditional method from basic to applied while 100 students (Group-B) intervention group were taught scenario based lectures from applied to basic by power point presentation. Five consecutive lectures were planned and for each lecture pre and post test were taken. At the same time feedback forms were given to intervention group for purpose of analyzing the results qualitatively and after intervention the crossover of groups were done.



**Table 1: Comparison of marks of lecture 1 to lecture 5 in control group at pre and post test**

		Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
Lecture 1	Pre Test	2.05	100	1.31	0.13	22.47	0.0001,S
	Post Test	5.65	100	0.84	0.08		
Lecture 2	Pre Test	1.96	100	1.32	0.13	24.83	0.0001,S
	Post Test	5.68	100	0.82	0.08		
Lecture 3	Pre Test	2.25	100	1.42	0.14	23.80	0.0001,S
	Post Test	5.90	100	1.04	0.10		
Lecture 4	Pre Test	2.36	100	1.41	0.14	23.69	0.0001,S
	Post Test	5.97	100	1.07	0.10		
Lecture 5	Pre Test	2.47	100	1.41	0.14	22.59	0.0001,S
	Post Test	5.92	100	1.04	0.10		

**Interpretation:** Statistical significant increase in mean value was observed in control group after post test ( $p < 0.05$ ).

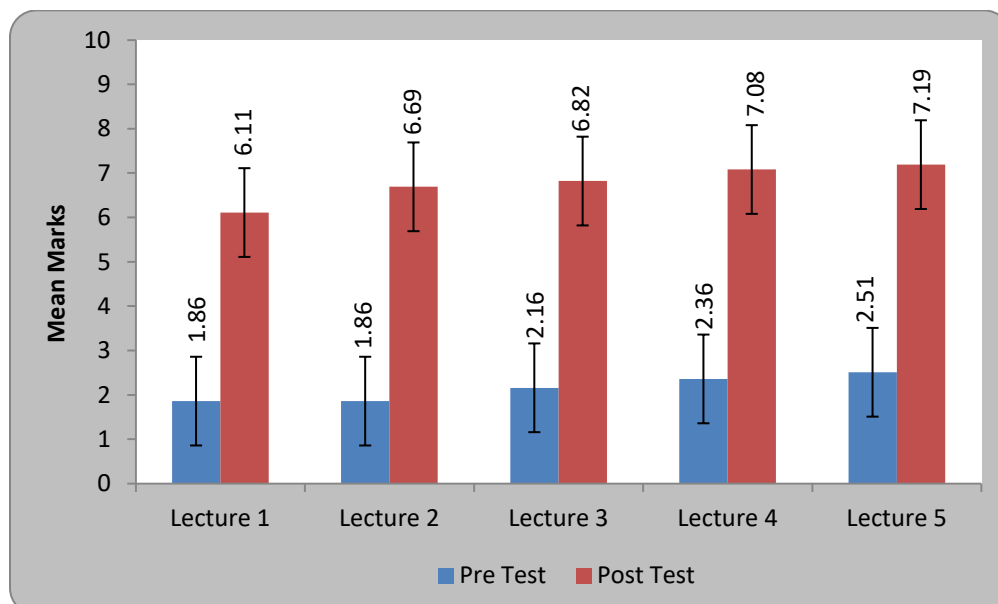


**Graph 1:** Comparison of marks of lecture 1 to lecture 5 in control group at pre and post test

**Table 2:** Comparison of marks of lecture 1 to lecture 5 in intervention group at pre and post test

		Mean	N	Std. Deviation	Std. Error Mean	t-value	p-value
Lecture 1	Pre Test	1.86	100	1.34	0.13	33.35	0.0001,S
	Post Test	6.11	100	1.34	0.13		
Lecture 2	Pre Test	1.86	100	1.34	0.13	27.37	0.0001,S
	Post Test	6.69	100	1.39	0.13		
Lecture 3	Pre Test	2.16	100	1.45	0.14	24.09	0.0001,S
	Post Test	6.82	100	1.33	0.13		
Lecture 4	Pre Test	2.36	100	1.38	0.13	24.74	0.0001,S
	Post Test	7.08	100	1.30	0.13		
Lecture 5	Pre Test	2.51	100	1.51	0.15	23.70	0.0001,S
	Post Test	7.19	100	1.26	0.12		

**Interpretation:** Statistical significant increase in mean value was observed in intervention group after post test ( $p < 0.05$ ).

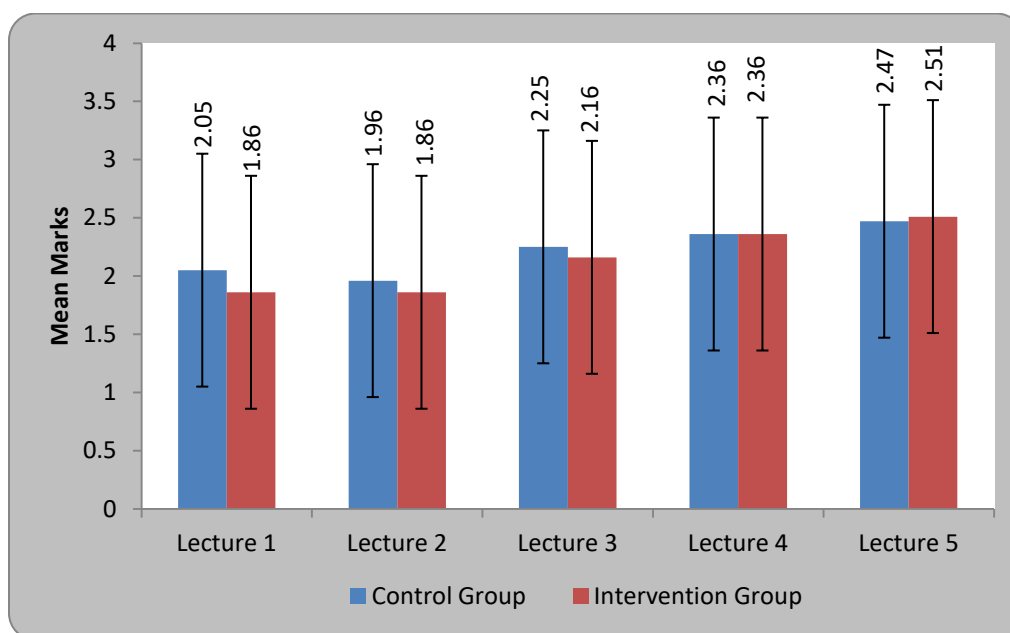


**Graph 2:** Comparison of marks of lecture 1 to lecture 5 in intervention group at pre and post test

**Table 3:** Comparison of marks of lecture 1 to lecture 5 in both the group at pre tests

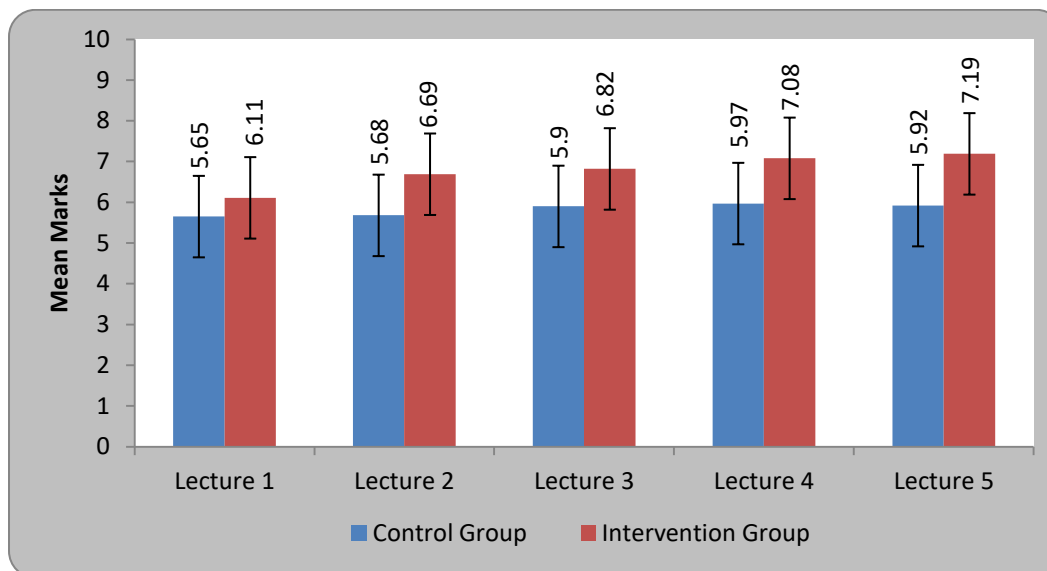
	Group	N	Mean	Std. Deviation	Std. Error Mean	t-value	p-value
Lecture 1	Control	100	2.05	1.31	0.13	1.00	0.31,NS
	Intervention	100	1.86	1.34	0.13		
Lecture 2	Control	100	1.96	1.32	0.13	0.52	0.59,NS
	Intervention	100	1.86	1.34	0.13		
Lecture 3	Control	100	2.25	1.42	0.14	0.44	0.65,NS
	Intervention	100	2.16	1.45	0.14		
Lecture 4	Control	100	2.36	1.41	0.14	0.00	1.00,NS
	Intervention	100	2.36	1.38	0.13		
Lecture 5	Control	100	2.47	1.41	0.14	0.19	0.84,NS
	Intervention	100	2.51	1.51	0.15		

**Interpretation:** No statistical significant difference was observed in mean value of both the groups at pre test.

**Graph 3:** Comparison of marks of lecture 1 to lecture 5 in both the group at pre tests**Table 4:** Comparison of marks of lecture 1 to lecture 5 in both the group at post tests

	Group	N	Mean	Std. Deviation	Std. Error Mean	t-value	p-value
Lecture 1	Control	100	5.65	0.84	0.08	2.89	0.004,S
	Intervention	100	6.11	1.34	0.13		
Lecture 2	Control	100	5.68	0.82	0.08	6.24	0.0001,S
	Intervention	100	6.69	1.39	0.13		
Lecture 3	Control	100	5.90	1.04	0.10	5.41	0.0001,S
	Intervention	100	6.82	1.33	0.13		
Lecture 4	Control	100	5.97	1.07	0.10	6.57	0.0001,S
	Intervention	100	7.08	1.30	0.13		
Lecture 5	Control	100	5.92	1.04	0.10	7.76	0.0001,S
	Intervention	100	7.19	1.26	0.12		

**Interpretation:** Statistical significant difference was observed in mean value of both the groups at post test. Results in intervention group were statistically highly significant as compared to control group in post test.



**Graph 4:** Comparison of marks of lecture 1 to lecture 5 in both the group at post test

Statistical analysis was done by using descriptive and inferential statistics using student's paired and unpaired t test and software used in the analysis were SPSS 22.0 version and GraphPad Prism 6.0 version and  $p < 0.05$  is considered as level of significance.

**Table 5:** Students feedback form based on likert scale:

Questions	SA (1)	A (2)	N (3)	D (4)	SD (5)
1. Has scenario based teaching created interest in learning the topic	9	79	0	0	0
2. Does scenario based teaching facilitates in development of critical thinking	4	56	2	0	0
3. I was able to understand the lecture power point presentation with scenario based teaching.	37	43	0	0	0
4. Scenario based teaching will help in recall of knowledge during exams.	32	42	7	0	0
5. Scenario based teaching be incorporated for important topics	62	28	0	0	0

6. Suggestions regarding incorporation of scenario based teaching in physiology lectures.

SA= strongly agree A= Agree N= Neutral D= Disagree SD= Strongly Disagree

**Perception:** As per the study perception of students from intervention group was taken. Their expressions in short were as follows. 88% percent of students reported scenario based teaching from applied to basic has created interest in learning the topic. 62% students reported there should be scenario based teaching for conceptual learning and development of critical thinking. 80% students reported they were able to understand lecture with the use of scenario based teaching from applied to basic. 81% students reported scenario based teaching will help them in recall of knowledge during exams. 92% of students reported scenario based teaching should be incorporated for important and maximum topics. 90% students suggested scenario based teaching should be incorporated in maximum topics of all the subjects.

#### Discussion

In the present study it was observed that using different means of teaching like incorporation of scenario based teaching from applied to basics makes learner to understand the topic much more effectively as compared

to traditional lecture. The results obtained as correct answers in the pre-test and post-test were analyzed statistically by applying students paired 't' test. As observed in table 1 and table 2, the post test results obtained by using traditional lecture as well as scenario based teaching aid are significant ( $p < 0.05$ ). The results obtained by comparing both the groups by applying students unpaired 't' test showed highly significant statistical mean value with incorporation of scenario based teaching in intervention group ( $p < 0.001$ ) as compared to control group as shown in table 4.

Similar results were observed in the study done by Sharma. S 2017, where perception of students showed that more than 90% of the students liked use of scenarios at the end of the lecture which made traditional lecture-based sessions more interesting, interactive, student oriented and also helped to increase their attention span. More than 85% of the students felt that the scenarios were greatly helpful in understanding the pharmacological concepts, improved critical thinking and made them more

motivated to do self-study. In our study after feedback analysis it was found that overall students showed inclination towards the understanding and learning by use of scenario based teaching from applied to basic.

Thus scenario based learning will be an added advantage for the learning process for first year MBBS students and will give an additional impact on understanding by the cognitive mode. Scenario based learning from applied to basic can improve the students thinking, reasoning and remembering lecture more effectively.

### Conclusion

According to the MCQ questionnaire and feedback analysis, the results showed that incorporation of scenario based teaching for better conceptual learning of applied physiology has an added advantage in making the students to learn and understand the physiology better rather than by using traditional lecture alone.

**Take home message:** Scenario based teaching can be used as an added powerful tool in understanding & learning physiology.

**Implication:** Incorporation of scenario-based teaching has tremendous potential for learning with enhancing student's cognitive mode of understanding as well as learning physiology for 1<sup>st</sup> year MBBS students.

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